

APPLICATION  
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TITLE: ORDER PROCESSING FOR AUTOMATED MARKET  
SYSTEM

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ORDER PROCESSING FOR AUTOMATED MARKET SYSTEM  
BACKGROUND

This invention relates to trading systems particularly financial trading systems.

Electronic equity markets, such as The Nasdaq Stock Market® collect, aggregate and display pre-trade information to market participants. In an electronic market pre-trade information takes the form of a quote that represents a single or an aggregate of same-priced principal or agency orders. A market such as Nasdaq also provides trading platforms through which market participants may access liquidity indicated in the marketplace. In such markets, trading occurs between market makers either for their own proprietary account or as agent to a customer. Also, however, other entities may display quotes or place orders for display in the market. For example, electronic commerce networks, (ECNs) are one type. Some ECNs charge quote access fees while others do not. Other entities include UTP Exchanges. UTP Exchanges are exchanges that have unlisted trading privileges. With these different sources of liquidity for investors, one concern of regulators relates to best trade execution.

SUMMARY

According to an aspect of the present invention, a system for an electronic market for trading of securities includes a client station for entering an order for executing against any Market Participant that can at least in part satisfy the order and with the client station displaying a graphical user interface that allows the user to choose a priority type for how the order interacts with contra side quotes/orders in the market.

According to an additional aspect of the present invention, a method for trading of securities in an electronic market includes entering at a client station an order that can immediately access market liquidity, with entering specifying a priority for how the order interacts with contra side quotes/orders in the market.

According to an additional aspect of the present invention, a method for trading of securities in an electronic market includes receiving from a client station an order that can immediately access market liquidity, with the order specifying a priority for how the order interacts with contra side quotes/orders in the market and executing the order in the market against the contra side interest in accordance with the priority type specified by the order.

According to an additional aspect of the invention, a computer program product for an electronic market for trading of securities includes instructions for causing a computer to receive orders entered from a client station the orders for execution against any market participant that can at least in part satisfy the order and determine a priority type for how the order interacts with contra side quotes/orders in the market.

One or more of the following advantages may be provided by one or more aspects of the present invention.

Non-Directed Order Processing takes into consideration that factors other than cost or access fees may be important to market participants in making investment decisions. The invention thus gives market participants a choice to determine how best to execute their customer or proprietary orders. The execution algorithm/logic for Non-Directed Orders provides a flexible approach allowing market participants choices of how best to

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interact with the market. This processing is an attempt to address best execution concerns while being flexible to meet participant's needs without imposing a needlessly rigid structure on the market. Additionally, a strict price/time priority (without choice) would force the public investor to pay ECN quote access fees, thus squashing competition.

# BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a market system.

FIG. 1A is a diagram showing a format for quotes.

FIG. 1B, a diagram depicting an entry screen for non-directed orders or preferenced orders.

FIG. 2A is a block diagram showing arrangement of an quote/order collector facility.

FIG. 2B is a logic view of functions in the quote/order collector facility.

FIG. 3A is a flow chart showing a quote/order manager.

FIG. 3B is a flow chart showing a montage manager.

FIG. 4 is a flow chart of an execution/routing manager.

FIG. 5 depicts the arrangement of FIGS. 5A-5D.

FIGS. 5A-5D are flow charts depicting details of the execution/routing process.

FIGS. 6A-6B are flow charts depicting processing for Directed Orders.

FIGS. 7A-7B are flow charts depicting processing for Preferenced Orders.

FIG. 8 is a flow chart of a quote montage update manager.

FIG. 9 is a diagram depicting a montage and order entry for directed orders.

## DESCRIPTION

Referring to FIG. 1, an electronic market 10 is shown. The electronic market 10 includes client systems 12 that access a central quote/order collector facility 20. The client systems 12 can be broker/dealer systems 12a, electronic communication networks (ECN's) 12b, market-marker systems 12c, and other exchanges 12d. The connections can use existing Nasdaq protocols

such as SelectNet®, Small Order Execution System<sup>SM</sup> (SOES<sup>SM</sup>), and so forth. The client systems 12 include a processor, memory and a storage device, e.g., a client workstation or personal computer (all not shown) that can include a client process to enter quotes/orders into the electronic market system 10. The quote/order collector facility 20 causes the order execution or order delivery systems (e.g., SOES<sup>SM</sup> and SelectNet®) to deliver executions or orders to a market that is coupled to a clearing system 16 and a reporting system 18. It also causes delivery of executions or routing of orders to the ECN's 12c, depending on the status of the ECN, and routing of orders to other markets and exchanges 12d. The quote/order collector facility 20 is comprised of one or preferably a plurality of server computers generally denoted as 22 including a processor 22a, main memory 22b and storage 22c. The storage system 22c includes quote/order collector process 25 that is executed in memory 22b. In general, server 22 is a complex computer server, the details of which are not important to an understanding of the present invention.

The quote/order collector facility 25 collects pre-trade information in the form of quotes or orders. The distinction between a quote and an order depends on several factors. For example, each market maker can send a proprietary quote, i.e., a quote that represents its own trading interest, or an agency quote that represents trading interest of a sponsored entity. If one proprietary quote is sent it could be considered one order. If one agency quote is sent it also could be considered one order. If an agency quote reflects an aggregation of more than one agency order, however, the aggregate agency order could be considered a quote. Entering quotes are limited to registered market makers 12b and ECNs 12c and possible UTP Exchanges 12d.

For any given stock, a registered market maker or ECN may directly enter a non-marketable order, i.e., quote into the system 20 on behalf of its customer account, or it may sponsor the direct entry of an order by its customer. All sponsored,  
5 quotes are sent to the quote/order collector facility 20 under the name of the sponsoring market maker or ECN. Every registered market maker or ECN can submit an unlimited number of non-marketable quotes to the system 20.

As shown in FIG. 1A, each quote 19 submitted to the electronic market system 10 can include a displayed quote size 19a, a reserve size 19b and an indication 19c (ATTR) of whether the quote size is attributable or non-attributable. Quote size 19a, when attributable based on indicator 19c, is directly attributable to the market maker or ECN and is displayed in a "current quote" montage an order display window 200 to be  
10 discussed below in FIG. 9. Quote size 19b when non-attributable is the size that the market maker or ECN wishes to display to the marketplace through an aggregate montage of the order display window 200 discussed below in FIG. 9. This quote size 19a is not  
20 attributable to the market maker or ECN until it is executed. Reserve size 19b is the size that is not displayed to the marketplace but that is immediately accessible through the quote/order collector facility 20. In order to use reserve size 19b, a market maker can be required to have a minimum amount  
25 displayed in the aggregate quote size 19a without attributable indicator 19c .

The current quote montage 204 of the window 200 without agency quotes is similar to the long existing Nasdaq® display montage, whereas the current quote montage 204 with the agency  
30 quotes as depicted in FIG. 9 is similar to that shown in U.S.

Patent Application Serial No. 09/208,942, filed on December 12, 1998 entitled "DUAL QUOTE MARKET SYSTEM" by Richard G. Ketchum et al. and assigned in part to the assignee of the present invention.

5           A broker/dealer can receive an order from a customer. The broker/dealer can send that order to the order collector facility 20 to be executed with quotes that are posted by electronic communication networks, market makers or other markets. In this embodiment, orders of broker/dealers are not posted as quotes.

10           Referring to FIG. 1B, an entry screen 17 for non-directed order entry is shown. The screen 17 allows a participant to enter non-directed orders and would generally include fields 17a-17e for entering information including price, amount, and also three type fields. The type fields 17c-17e determine how the order interacts in the execution/routing manager 26d against Quoting Market Participant's contra-side quotes/orders. The type fields choose a priority, e.g., price/time box 17c; or price/size/time box 17d; or price/time that accounts for ECN access fees box 17e.

20           The screen 17 can also have a field 17f to enter a quoting market participant's symbol for the purpose of entering preferenced orders. Optionally, the screen 17 can have fields 17g, 17h to indicate a preference order type, e.g., a preferenced order that has price restrictions box 17g or a preferenced order that does not have price restrictions box 17h. Alternatively, the electronic market system 10 can be configured to accept only one type of preferenced order and not the other.



# ORDER COLLECTOR FACILITY

Referring to FIG. 2A, the quote/order collector facility 20 receives quotes, liability orders, (non-liability orders) and directed orders from market participants. The quote/order collector facility 20 allows a quote/order to be displayed in the market, and also allows for marketable orders to be executed or routed to market participants.

The order quote collector facility 20 also includes an interface 21 that couples the order collector facility 20 to a plurality of order delivery systems. For example, the interface 21 can couple the order quote collector facility 20 to an order execution system, e.g., the Small Order Execution System® (SOES<sup>SM</sup>) and to an order delivery and negotiation system, e.g., SelectNet®. The interface 21 would provide access to information contained in order flow delivered via the delivery systems to a quote/order collection process 25 described in conjunction with FIG. 2B. In general, the electrical and logical functions which comprise the interface 21 can be similar to the ones currently existing in the SOES<sup>SM</sup>/SelectNet® systems. The interface 21 or the process 25 would extract information from the quotes and make that information available to the quote order collector process 25. The quote/order collector process 25 extracts information and processes orders in a unified manner to allow the order collector system 20 to be a unifying point of collection of all orders which are sent to the market 10.

The interface 21 can also be used to route executions of liability orders back to market participants whose quotes/orders were executed against and can deliver orders, both liability orders for execution or non-liability orders for negotiation against market participants whose quotes are selected for further

negotiation via the SelectNet® systems.

Referring to FIG. 2B, the quote/order collector process 25 is shown. The quote/order collector process 25 provides transmission of multiple orders or quotes at multiple price levels by Quoting Market Participants to a quotation manager 26a. The quote/order manager 26a provides a unified point of entry of quotes and orders from disparate delivery systems into the quote/order collector facility 20 to access quotes/orders displayed (as either attributable or non-attributable) in both the aggregate montage and current quote montage. The quote/order manager 26a manages multiple quotes/orders and quotes/orders at multiple price levels and uses a montage manager 26b to display (either in the Aggregate montage or in the current quote montage) the orders/quotes consistent with an order's/quote's parameters. The order collector process 25 also includes an internal execution process manager 26c to match off executions for quoting market participants at the best bid/offer. The order collector system 20 also includes an order routing/execution manager 26d providing a single point delivery of executions or routing of orders, which substantially eliminates potential for dual liability. That is, order collector process 25 will maintain the order routing and executions functionality available in the SOES<sup>SM</sup> and SelectNet® systems. The order collector process 25 also includes a quote update manager 26e, a lock/cross quote manager 26f, and an odd lot execution manager 26g.

Referring to FIG. 3A, the order collector process 25 receives orders/quotes and time stamps 42 each order/quote upon receipt. This time stamp determines the order's/quote's ranking for automated execution. Quotes/orders are designated as either attributable or non-attributable, and could also have a reserve

size discussed above. The order collector process 25 aggregates all of a Quoting Market Participant's attributable and non-attributable orders at a particular price level, and disseminates order/quotation information into the aggregate montage and/or the current quote montage, as will be discussed below.

The order entry process 25 determines 43 whether the received quote/order corresponds to a reserve quote. If the quote does not correspond to a reserve quote then the quote is a displayable quote that is attributable or non-attributable. The order entry process 25 compares 44 the received quotes/orders to existing quotes/orders to determine 46 whether the price of quotes/orders fall in existing quote/order price levels. Any number of quote/order price levels can be accommodated although in this example, only three price levels will be displayable in the non-attributable i.e., aggregate montage. If the quote price is in a displayable price level it is a displayable quote eligible for automated execution. The order collector system 20 can be provided with more price level depth than the three levels, e.g., a depth of 20-25 levels although only a limited number, e.g., three would be displayed at any one time.

If the quote is within one of the pre-defined quote levels, the process 25 determines 48 new non-marketable quote/orders sizes by adding the quote/order size corresponding to the received quote/order to quote sizes at that price level already in the system 20. The process 25 will cause the new non-marketable quote sizes to be displayed 50. If the quote is not within one of the pre-defined quote levels, the process 25 stores 52 the quote at a new price level determines 54 if it is at a better price. If the quote is at a better price, the

process 25 changes 56 current levels to cause a new price level for non-marketable quote sizes to be displayed 50.

Referring to FIG. 3B, the montage manager 26b of the quote/order collector process 25 determines 60 which price levels to display and determines 61 if an order is a non-attributable order. If the order is non-attributable, the quote/order collector process 25 will store and sum 66 the quote with like quotes to produce an aggregated quote and display 68 the aggregate size of such orders in the aggregate montage when the orders fall within one of the three top price levels. For attributable orders, the aggregate size of such orders is displayed in the current quote montage once the order(s) at a particular price level becomes the particular quoting market participant's best attributable bid or offer in the current quote montage. This interest will also be aggregated and included in the aggregate montage if it is within the displayed price levels. Market makers and ECNs can have one MMID and possibly an agency MMID against which they can display attributable quotes. If a market maker has an agency quote, attributable orders will be displayed once the order or orders at a particular price level become the market participant's best agency quote.

Quote/order collector system 20 provides several advantages to the market. One advantage is that it ensures compliance with the regulatory rules such as the SEC Order Handling Rules, and in particular the Limit Order Display Rule and SEC Firm Quote Rule. With system 20 it is less likely that a Quoting Market Participant, because of system delays and or/fast moving markets, will miss a market because the Quoting Market Participant is unable to quickly transmit to system 20 a revised quote (which may represent a limit order).

### Nondirected Orders

Referring to FIG. 4, the market 10 allows market participants that enter Non-Directed Orders three options as to how the order interacts with the quotes/orders in the system 20.

5 An exemplary format was described above in FIG. 1B. These choices are that the orders can execute against displayed contra side interest in strict price/time; or price/size/time; or price/time that accounts for ECN access fees. This can be set by selecting one of the options on the order entry screen (FIG. 1B).  
10 As a default, the system 20 can execute Non-Directed Orders in general price/time priority. A non-directed order is an order that is not executed or routed for response to a particular Quoting Market Participant, e.g., a particular market maker or ECN.

15 A market participant can immediately access the best prices in system 20, as displayed in the aggregate montage, by entering 72 a non-directed order into the OCF 25. A non-directed order is designated as a market order or a marketable limit order and is considered a "Liability Order" and treated as such by the  
20 receiving market participant. If a non-directed limit order is marketable when entered into the system 20 but subsequently becomes non-marketable because of a change in the inside market, the system 20 may hold 74 the order for e.g., 90 seconds and not immediately return the order to the participant. If within the  
25 holding period e.g., 90 seconds, the order once again becomes marketable, the system 20 will execute/send the order to the next Quoting Market Participant in the non-directed order queue. Additionally, the order entry participant can obtain 76 the status of the order and request a cancel of such order (not  
30 shown). In some embodiments, the hold period can be less or can

be eliminated and also can be selectively applied to market participants depending on how they participate in the market.

Upon entry, the OCF 25 will determine 78 what market participant is the next Quoting Market Participant in queue to receive an order, based on how the participant desires to have the order interact in the system 20. Depending on how that receiving Quoting Market Participant participates in system 20 (i.e., automatic execution v. order delivery), the OCF 25 will either cause delivery 80 of an execution (via SOES<sup>SM</sup>) or delivery of a Liability Order (via SelectNet).

#### Order Execution Manager

FIGS. 5, 5A-5D, show processing in the order execution/routing manager 26d. The order execution/routing manager 26d will execute non-directed orders against Quoting Market Participant's quotes/orders based on the chosen priority, e.g., contra side interest in strict price/time; or price/size/time; or price/time that accounts for ECN access fees priority. As noted above, each quote/order when entered into the OCF 25 receives a time stamp. The order execution/routing manager 26d will deliver all orders at the best bid/best offer in chosen priority. The order execution/routing manager 26d can first attempt to provide a match off of orders/quotes entered by a Quoting Market Participant if the participant is at the best bid/best offer by calling the internal execution manager 26c (FIG. 4). Thus, the order execution/routing manager 26d will call the internal order execution manager 26c to try to match off a Quoting Market Participant's orders and quotes that are in the system 20 if the participant is at the BBO and receives a market or marketable limit order on the other size of the market.

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The system 20 has a default, e.g., a strict price/time priority. If a market participant does not override the default or selects price/time 94, (FIG. 5A) a Non-Directed Order would be executed 96 first against all displayed quotes/order of market makers, ECNs, and non-attributable agency orders of UTP Exchanges, in time priority between such interest. If the order is not satisfied 98 at that level of priority the order will execute 100 against the reserve size of market makers and ECNs in time priority between such interest. If the order still is not satisfied 102, (FIG. 5B) the order will execute 104 against principal quotes of UTP Exchanges, in time priority between such interest.

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Alternatively, a market participant can indicate that the orders execute against contra side interest on a price/size/time basis. A Non-Directed Order would execute 106 (FIG. 5A) against displayed quotes and then reserve size based on the size of the displayed quote, and then time if there is a tie in size. Reserve size is executed against based on the size of the related displayed quote/order, not the total amount held in reserve. Under this option, orders are processed first against displayed quotes/orders of market makers, ECNs, and agency quotes/orders of UTP Exchanges in price/size/time priority between such interest. If the order is not satisfied 108 (FIG. 5B) at that level of priority the order will execute 110 against reserve size of market makers and ECNs, in price/size/time priority of such interest, with size priority based on the size of the related displayed quote/order. If the order is still not satisfied 112 (FIG. 5C) at that level of priority the order will execute 114 against principal quotes of UTP Exchanges, in price/size/time priority between such interest.





With all three approaches, the market 10 would make an exception for Non-Directed Orders entered by a market participant when that market participant is also at the inside market. In that case, the system 20 will match off the Non-Directed Order to buy/sell against that market participant's inside quote/order to sell/buy, in lieu of sending it to the participant next in the queue. Additionally, there would be an exception for "Preferred Orders" described below.

The Non-Directed Order Processing takes into consideration that factors other than cost or access fees may be important to market participants in making investment decisions. The system 20 gives market participants the choice to determine how best to execute their customer or proprietary orders. The execution algorithm/logic for Non-Directed Orders provides a flexible approach allowing market participants choices of how best to interact with the market. This processing is an attempt to address best execution concerns while being flexible to meet participant's needs without imposing a needlessly rigid structure similar to a central limit order book ("CLOB"). Additionally, a strict price/time priority (without choice) would force the public investor to pay ECN quote access fees, thus squashing competition.

Referring to FIG. 5D, if the order is not filled 136, the order execution/routing manager 26d will move 134 to the next price level, after a predefined delay, e.g., a 5 second interval delay 132 before attempting to execute an order at the new price level. The price-level interval delay will give market participants time to adjust their quotes and trading interests before the market moves precipitously through multiple price levels, which may occur when there is news, rumors, or

significant market events. Thus, the price-level interval delay is a modest and reasonable attempt to limit volatility. In some embodiments this delay can be eliminated.

#### Directed Orders

5 Referring to FIG. 6A, directed order processing 150 is shown. The current quote montage allows Quoting Market Participants to advertise their buying or selling interest. Directed Order processing rules in system 20 allow ECNs and market makers to elect to receive liability orders against their quote. A market maker or ECN could choose to receive a Directed Order that is also a liability order, or could also choose to accept only non-liability Directed Orders. The market maker or ECN designates that it desires to receive directed order as liability or non-liability, i.e., negotiation orders. Each market participant can inform the market on how it desires to receive directed orders. In some embodiments this can be across all stocks traded by the market participant whereas in other embodiments it could be on a stock by stock basis.

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20 The system 20 fetches information from a profile set up for the market participant to determine 152 the type of directed order the quoting market participant accepts. The process 150 determines 154 if the quoting market participant chooses to accept directed liability orders. If the quoting market participant chooses to accept directed liability orders the system 20 appends 156 an indicator to the quoting market participant's MMID, showing that the market participant is available to receive directed liability orders.

25 Referring to FIG. 6B, to access 160 a specific quote in the current quote montage, the system 20 receives 162 a "directed

order" entered by a market participant into the OCF 25 to begin the negotiation process with a particular Quoting Market Participant. The participant enters a Directed Order into the system 20 via an interface at a client system. This is accomplished by using a mouse or other device to access a specific Attributable Quote/Order displayed in the Quotation Montage, discussed below. An example of directed order entry is shown in FIG. 9.

The process 160 determines 164 if the Quoting Market Participant to which a Directed Order is being sent has indicated that it wishes to receive Directed Orders that are Liability Orders. Such liability directed orders must be designated at the time of entry as an "All-or-None" order ("AON") or a "Minimum Acceptable Quantity" (MAC) order. The system 20 will check 166 to make sure that these conditions are satisfied. An AON order is an order that is at least one normal unit of trading (e.g. 100 shares) in excess of the Attributable Quote/Order of the Quoting Market Participant to which the order is directed. A "Minimum Acceptable Quantity" order ("MAQ") has a size value of at least one normal unit of trading in excess of Attributable Quote/Order of the Quoting Market Participant to which the order is directed. The Directed Order may have a time in force of e.g., 1 to 99 minutes. In some embodiments, the liability orders can have other characteristics that would make it a non-liability orders under regulatory or market rules.

If the order is a valid liability order or a nonliability order, the order is routed 168 by the system 20 to a specific MMID designated by the market participant. Directed Orders are always delivered for response (accept or decline), as opposed to an automatic execution via the system 20 against the receiving

market participant's quote. Directed Orders can access liquidity held by a specific market maker or ECN. Directed Orders are processed independent of the Non-Directed Order queue.

5 In prior systems, the purpose of a non-liability designation was to limit the potential for dual liability that results from having two (non-linked) points for delivering liability orders against the same market maker quote. With this approach the directed order options allow a market participant to set-up order routing arrangements that are outside of the directed order process and provide executions to incoming orders in amounts that are in excess of displayed quotes. This would be of special interest to institutional market makers and ECN's.

#### Preferred Orders

10 Referring to FIG. 7A, processing 180 for a class of orders referred to as "Preferred Orders" is shown. A preferred order is an order that is preference to a particular quoting market participant e.g., market maker or ECN. Preferred Orders can be of two types. Preferred Orders of either type are entered into the system 20 through the Non-Directed Order Process. The market participant entering the Preferred Order designates the quoting market participant by its identification symbol ("MMID"). Preferred Orders are processed in the same "queue" as Non-Directed Orders.

20 The Preference Order is considered a liability order. As  
25 with Non-Directed Orders, a Preferred Order will be delivered as an order to a market participant that does not participate in the automatic execution functionality of the system 20, or will be delivered as an execution against the preferred market maker, as well as market participants that choose to accept

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That is, today market participants often use the SelectNet service to send orders to market makers or ECNs who are quoting at the BBO or away from the BBO. Market participants sometimes attempt to "sweep the street" or access liquidity at or near the inside market. A market maker that is "working" an institutional order may also send a SelectNet message to a market maker or ECNs who is quoting away from the inside. This may occur if the market maker believes the market participant has greater size to offer, and thus will result in a more efficient execution for the institutional customer. This functionality does not obviate best execution obligations.

With Preferred Orders with Price Restrictions 196 there will be price restrictions that accompany the Preferred Orders. That is, when a Preferred Order is next in line to be executed from the Non-Directed Order queue, the Preferred Order will be executed (or delivered for execution) against the preferred quoting market participant to which the order is being directed only if the quoting market participant is at the BBO (up to the displayed and reserve size). If the quoting market participant to which the order is being directed is not at the BBO when the Preferred Order is next in line to be delivered or executed, the Preferred Order will be returned to the entering participant. Thus, under this approach, Preferred Orders only will be executed at the BBO, and only if the preferred quoting market participant is quoting at the BBO at the time of order delivery (or execution).

#### Comparison of Directed Orders and Preferred Orders.

The Directed Order and Preferred Order features provide different options for order processing. The Directed Order

Process operates much like SelectNet operates in the current environment except that the current system 20 offers a choice of how the directed orders are treated by the quoting market participants. Directed Orders will be delivered to a single market participant that is designated by MMID by the sender of the order. Directed Orders are always delivered for response (e.g., accept or decline), as opposed to an automatic execution against the receiving market participant's quote. Directed Orders will not decrement a quote.

Preferred Orders on the other hand share some functionality with Non-Directed Orders, in that they are processed in time sequence, will be delivered to a quote/order or will automatically execute against a quote/order of a market participant, and will decrement the size of a quote/order. Unlike Non-Directed Orders, however, Preferred Orders are not processed pursuant to one of the three order execution algorithms described above.

Referring to FIG. 8, a quote update process in the quote size manager 26e is shown. The process determines 202 participant type. If an execution is delivered to a Quoting Market Participant if that participant accepts automatic executions (i.e., market makers or ECNs that choose to accept automatic executions via the SOES<sup>SM</sup>), quote size manager 26e will automatically decrement 204 the aggregate quote in the aggregate montage by the size of the incoming order, and the Quoting Market Participant's quote in the current quote montage if the quote/order is attributable. For Quoting Market Participants who accept automatic execution, if the participant's displayed size is decremented to zero 206, the Quoting Market Participant's displayed (attributable or non-attributable) size will be

replenished from reserve if the market participant has reserve size by calling 208 an auto quote refresh.

If an ECN accepts automatic execution via SOES<sup>SM</sup> its display size will be decremented 220, and if its quote is exhausted to zero 222 without update or without transmission of another attributable quote/order, quote size manager 26e will zero out 224 the one side of the quote that is exhausted. If both the bid and offer size of the ECNs market is reduced to zero 226 without update or transmission of another attributable quote/order, the ECN will be placed into an excused withdrawal 228 and restored once the ECN transmits revised quotes.

For Quoting Market Participants that do not participate in automated execution, e.g., ECNs that opt out of automatic execution and UTP Exchanges that only participate in order delivery, the execution manager 26d will deliver a Liability Order of a size that is equal to or less than the participant's quoted size. System 20 will automatically decrement 230 the participant's 222 quote by the size of the order delivered, but quote size manager 26e will move 232 the participant to the bottom of the queue and not deliver another order to such Quoting Market Participant until the Quoting Market Participant has processed the order by providing a complete or partial fill of the order. If such Quoting Market Participant declines or partially fills the order, System 20 will send the order (or remaining portion thereof) back into the queue for delivery to the next available Quoting Market Participant. In addition, if the Quoting Market Participant declines or partially fills the order, or if the participant fails to respond in any manner within a number of seconds of order delivery (e.g., 30 seconds), System 20 will presume equipment failure and will take corrective



action.

For ECN's, quote size manager 26e will zero out that side of the ECN's market, and for UTP Exchanges quote size manager 26e will place the participant at the lowest bid and highest offer price for a trading unit e.g., 100 shares until updated. This is necessary to ensure that Quoting Market Participants that do not provide timely executions due to equipment or other failures do not hold up the market and cause queuing of orders within the system 20. As noted previously, market makers will be required to maintain a two-sided, attributable proprietary quote (other than its Agency Quote) in system 20 at all time. To assist with this requirement, market makers can use an AutoQuote Refresh ("AQR") process e.g., that available in the SOES<sup>SM</sup>.

When a market maker's proprietary quote (both displayed and reserve) is exhausted to zero, the system will refresh the market maker's price on the bid or offer side of the market, whichever is decremented to zero, by an interval designated by the market maker and the market makers size to a level designated by the market maker. When the market maker's quote is refreshed, however, the AQR will refresh the market maker's attributable quote/order (not the non-attributable quote). AQR will not be available for Agency Quotes. Additionally, if a market maker does not use AQR but otherwise has another attributable proprietary quote in System 20, System 20 will automatically display the market maker's next best attributable proprietary quote when its current attributable quote is exhausted.

If a market maker's quote is decremented to zero and does not update its non-agency quote via AQR, transmit a revised attributable quote to System 20, or have another proprietary attributable quote/order in system 20, system 20 will place the

market maker's quote (both sides) in a closed state for a short period of time, e.g., three minutes. At the end of that time period, if the market maker has not on its own updated its quote or voluntarily withdrawn its quote from the market, System 20 will refresh the market maker's quotation to 100 shares at the lowest market maker bid and highest market maker offer currently being displayed in that security and reopen the market maker's quotation.

#### Montage

Referring to FIG. 9, the system 20 uses a composite montage 250. One component of the composite montage 250 is the current montage 254 that exists in the current Nasdaq Workstation II, (NWII) presentation. The current montage 254 has two primary display components. One component 255 is the Market Minder Window, which allows market participants to monitor price activity (inside bid/offer and last sale) of selected stocks, and the Dynamic Quote window, which shows for a particular stock the inside bid and offer, the last sale, change in price from previous close, daily high and low, volume, and the short sale arrow indicator. The other component is current quote montage 257. The current quote montage 257 shows for a particular stock two columns (one for bid, one for ask), under which is listed the MMIDs for each registered market maker, ECN, and UTP Exchange in the particular stock and the corresponding quote (price and size) next to the MMID. System 20 ranks the bids and offers along with the corresponding MMID in price/time priority. Accordingly, the market participant at the best bid who is first in time appears first in the montage, the market participant at the best bid (or the next best bid) who is next in time is ranked second, and so

forth.

Market makers are required to submit a two sided proprietary quote, and ECNs that participate in System 20 may submit a one or two sided quote. UTP Exchanges generally submit two sided quotes, which represent the exchange specialist's best quote in the stock at issue. While a market maker's quoted price and size is attributed to the market maker by the corresponding MMID, this may not represent the market maker's best price if the market maker has placed a better priced order into an ECN that complies with the Display Alternative Rule or designate its better priced quote as non-attributable.

Accordingly, a market maker may be displaying in the current quote montage a proprietary bid of \$20 when the market is \$20 1/8 to 20 1/4, but the market maker may be displaying in a qualifying ECN a bid of \$20 1/16. The \$20 1/16 quote may only be seen by subscribers of the ECN in which the market maker has placed the order and is not visible to the system 20 or market participants unless and until \$20 1/16 becomes the best bid in the ECN.

A Quoting Market Participant may indicate that a quote/order has reserve size. Reserve size will apply to a market maker's proprietary as well as Agency Quote, and the market maker may be required to display a minimum number of shares, e.g., 1,000 shares. Reserve size will replenish displayed size (attributable only or non-attributable) by at least 1,000 shares (or a default amount) once displayed size is decremented to zero. Reserve size along with displayed (both attributable and non-attributable) size, will be accessible through system 20. Reserve size, however, will not be displayed in either the aggregate montage or the current quote montage. As described above, system 20 will access reserve size after all displayed size is exhausted.

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The current quote montage 254 also includes a special MMID (here referred to as "SIZE") that represents the aggregate size of all non-attributable quotes/orders at the best bid/best offer displayed in the current quote montage 254 along with the other MMIDs for the Quoting Market Participants displaying attributable size at the inside. There is one "SIZE" MMID for the bid and offer side of the market. The aggregate size of the best bid/best offer displayed in the aggregate montage will equal the sum of the SIZE MMID displayed and the individual sizes of the MMIDs at the best bid/best offer displayed in the current quote montage. The "SIZE" MMID is provided to properly calculate and disseminate the system 20 best bid and best offer ("BBO") along with the accompanying market center, e.g., for a national quotation service.

System 20 provides a "Summary Scan" function as part of the aggregate montage. The Summary Scan function is a query function that can provide information at the total displayable size (attributable and non-attributable) for all levels. The Summary Scan anonymously displays interest (attributable and non-attributable) at each price level on both sides of the market, but is not dynamically updated.

The system 20 can use "point-and-click" window-type technology so that market participants can enter non-directed or preferenced marketable orders by simply clicking on controls in aggregate quote montage 254 in the window 250. For example, each of the entries in the aggregate quote montage 254 can be a control button so that a simple click on the control, e.g, the total shares displayed 255a (FIG. 4) can activate an execution. The click with a mouse or the like at the inside bid in the top-half of the window 250 could enter a "default" order priced at

the displayed price for the displayed shares. The system 20 would allow a trader to set a "default" number of shares, e.g., 1000 shares. For example, whenever a trader clicked on the aggregate shares displayed at the inside bid the trader's system 12 would generate an order for 1,000 shares at the inside price. In addition, a "right-click" on the aggregate display would permit a trader to customize the order at the point of entry. A window can pop up allowing the market participant to enter the information as described in FIG. 1B. Of course some of this information may be automatically entered by the system.

The system can also allow a market participant to enter directed orders in much the same manner by clicking on a quote in the current quote montage. The system will produce a window 260 that allows a participant to enter a size and select if the directed order is "AON" or "MAQ" type.

#### Other Embodiments

Other embodiments are within the scope of the following claims.